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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,078	07/08/2003	Hun-Kee Kim	45386	8341

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EXAMINER	
DSOUZA, JOSEPH FRANCIS A	
ART UNIT	PAPER NUMBER
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/29/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/614,078	KIM ET AL.	
	Examiner	Art Unit	
	Adolf DSouza	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,8,10,12,17,19,21,26,27,29 and 34* is/are rejected.

7)☒ Claim(s) *2,4-7,9,11,13-16,18,20,22-25,28,30-33 and 35* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 July 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Drawings

1. The drawings are objected to because:

- In Figure 3, the signals y (n-1) ... y (n-N) are all delayed by 1 and not by 1, 2, ...N respectively.

- In Figure 6A, the description says "High-Speed Channel" but the waveform shown varies at a slow speed. Similarly, in Figure 6B, the description says "Low-Speed Channel" but the waveform varies at a high speed.

- In Figures 7B and 9B, the speed should be changed from "500 km" to "500 km/hr".

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application

must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities:

- In the specification (page 9, line 17). "If Tx-diversity is provided" should be changed to "If Tx-diversity is not provided".

- On page 10, (Table 1), the heading in the first column should be changed from "A" to "a" to make it consistent with what is described elsewhere in the specification.

- On page 15, lines 14 and 25, "an example of a mapping example of filter" should be changed to "an example of a mapping of filter".

Appropriate correction is required.

Claim Objections

3. Claim 19 is objected to because of the following informalities: The language in limitation (f) should be changed to improve the clarity of the limitation.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 3, 10, 12, 21, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Whitecar (US 6,055,318) in view of Gothe et al. (US 6,049,577) and further in view of Ferguson (US 6,907,143), Liu (Modified Autocorrelation Method Compared With Maximum Entropy Method and RF Cross Correlation as Mean Frequency Estimator for Doppler Ultrasound, 1991 Ultrasonics Forum, pages 1285 – 1290) and Massie et al. (US 5,943,427) .

Regarding claim 1, Whitecar discloses a method for determining first and second filter coefficients (Fig. 4, elements b_0 and a_1; column 2, lines 21 - 25) in a noise elimination

filter (Fig. 1, element LPF 10; Fig. 4, element 10; column 1, lines 9 – 15, 45 – 57; column 2, lines 4 – 6, 11 – 12, 21 - 29) which receives signal (Fig. 1, input "Audio signal") and removes a noise component from the signal, comprising the steps of:

and b) determining first and second filter coefficients mapping-processed by the detected noise level (Fig. 4, feedback loop to element 13; column 2, lines 40 – 42; wherein the error signal is used to adapt the coefficients a_1 and b_0).

Whitecar does not disclose a predicted channel response, the sum of the filter coefficients is a predetermined value, detecting a noise level, detecting the channel speed information, and determining the filter coefficients from the noise and channel speed information.

In the same field of endeavor, however, Gothe discloses a predicted channel response (Fig. 5, element 53 output; column 3, lines 61 - 67) and detecting a noise level upon receiving a difference between the predicted channel response signal and a previously predicted channel response signal (Abstract; column 2, lines 12 – 19; column 5, lines 1 – 15; wherein the noise level is the average of the error signals and the channel response signal are interpreted as the received input signals).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Gothe, in the system of Whitecar because this would allow the transmitted symbol to be estimated for decoding, and detection of the noise level as is well known in the art.

In the same field of endeavor, however, Ferguson discloses the first and second filter coefficients where their sum is set to a predetermined value (Fig. 2, elements b0 and a1; column 3, lines 47 - 49).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Ferguson, in the system of Whitecar because this would allow for the filter to have unity DC gain, as disclosed by Ferguson.

In the same field of endeavor, however, Liu discloses detecting channel speed prediction information upon receiving an auto-correlation function of the predicted channel response signal (page 1285, left column, section 1 "Introduction", 1st paragraph, last 6 lines; page 1286, section 3.2 Autocorrelation Method – end of section 3.3 {in particular, page 1287, left column, paragraph starting with "From Eqn. (24)"}).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Liu, in the system of Whitecar because this would enable the Doppler to be estimated and it's effect removed from the received signal, as is well known in the art.

In the same field of endeavor, however, Massie discloses determining first and second filter coefficients mapping-processed by the detected channel speed prediction information (Fig. 9, elements 906, 908; column 10, lines 37 – 41; column 9, lines 5 - 7).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Massie, in the system of Whitecar because this would allow simulating the reflective properties, as disclosed by Massie.

Regarding claim 3, Whitecar does not disclose calculating the noise level.

In the same field of endeavor, however, Gothe discloses detecting a noise level by the equation $\alpha = \frac{1}{M_{pilot}} \sum_{n=1}^{M_{pilot}} \left| \bar{c}(n) - \bar{c}(n-1) \right|$ (Abstract; column 2, lines 12 – 19; column 5, lines 1 – 15; wherein the noise level is the average of the error signals, the channel response signal is interpreted as the received input signal, and the M_{pilot} length used for averaging is the length over which the noise is calculated).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Gothe, in the system of Whitecar because this would allow the detection of the noise level as is well known in the art.

Claim 10, 12, 29 are directed to apparatus of the same subject matter claimed in the method/steps claims 1, 3, 3 respectively and therefore, are rejected as explained in the rejection of claims 1, 3, 3 above.

Claim 21 is similarly analyzed as claim 3.

6. Claim 8, 17, 26, 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Whitecar (US 6,055,318) in view of Gothe et al. (US 6,049,577) and further in view of Ferguson (US 6,907,143), Liu (Modified Autocorrelation Method Compared With Maximum Entropy Method and RF Cross Correlation as Mean Frequency Estimator for Doppler Ultrasound, 1991 Ultrasonics Forum, pages 1285 – 1290), Massie et al. (US 5,943,427) and Gandhi (US 6,263,354).

Regarding claim 8, Whitecar does not disclose unequally distributed coefficient sin the IIR filter.

In the same field of endeavor, however, Gandhi discloses the second filter coefficient is unequally distributed to N coefficients due to different weights, when the noise elimination filter is an N-th noise elimination filter (Fig. 10, elements $a_1 – a_3$; column 11, lines 55 – 59; wherein the unequal coefficients are the general coefficients $a_1 – a_3$).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Gandhi, in the system of Whitecar because this would allow for an arbitrary filter spectrum to be obtained.

Claim 17, 34 are directed to apparatus of the same subject matter claimed in method/steps claim 8 and therefore, is rejected as explained in the rejection of claim 8 above.

Claim 26 is similarly analyzed as claim 8.

7. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Whitecar (US 6,055,318) in view of Gothe et al. (US 6,049,577) and further in view of Liu (Modified Autocorrelation Method Compared With Maximum Entropy Method and RF Cross Correlation as Mean Frequency Estimator for Doppler Ultrasound, 1991 Ultrasonics Forum, pages 1285 – 1290), Massie et al. (US 5,943,427), Conner et al. (US 4,450,445) and Ito (US 20020009128).

Regarding claim 19, Whitecar discloses a method for receiving a signal and removing a noise from the received signal (Fig. 1, element LPF 10; Fig. 4, element 10; column 1, lines 9 – 15, 45 – 57; column 2, lines 4 – 6, 11 – 12, 21 - 29) which receives signal (Fig. 1, input "Audio signal"), comprising the steps of:

f) determining first and second filter coefficients mapped to an area corresponding to the comparing result to be filter coefficients for noise elimination, said first and second filter coefficients being mapping-processed for every area assigned by the first and second reference values (Fig. 4, feedback loop to element 13; column 2, lines 40 – 42;

wherein the error signal is used to adapt the coefficients a_1 and b_0) ;

g) removing a noise component from the predicted fading channel response signal using the determined first filter coefficient and the determined second coefficient (Fig. 1, element LPF 10; Fig. 4, element 10; column 1, lines 9 – 15, 45 – 57; column 2, lines 4 – 6, 11 – 12, 21 - 29).

Whitecar does not disclose receiving a common pilot channel signal at an adaptive channel estimator of a mobile communication system, multiplying a complex conjugate of a corresponding pilot symbol by the common pilot channel signal, detecting channel speed and comparing the noise and Doppler with thresholds.

In the same field of endeavor, however, Gothe discloses receiving a common pilot channel signal at an adaptive channel estimator of a mobile communication system (Abstract, 1st 6 lines; Fig. 5, element 51; column 3, lines 61 - 67) and (b) detecting a noise level contained in the predicted fading channel response signal (Abstract; column 2, lines 12 – 19; column 5, lines 1 – 15; wherein the noise level is the average of the error signals and the channel response signal are interpreted as the received input signals).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Gothe, in the system of

Whitecar because this would allow the transmitted symbol to be estimated for decoding and detection of the noise level as is well known in the art.

In the same field of endeavor, however, Ito discloses (a) multiplying a complex conjugate of a corresponding pilot symbol by the common pilot channel signal, and outputting a predicted fading channel response signal (page 4, paragraphs 84, 101).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Ito, in the system of Whitecar because this would allow for the received signal to be despread by the pilot symbols, as is well known in the art.

In the same field of endeavor, however, Liu discloses (c) detecting a channel speed of the common pilot channel signal on the basis of the predicted fading channel response (page 1285, left column, section 1 "Introduction", 1st paragraph, last 6 lines; page 1286, section 3.2 Autocorrelation Method – end of section 3.3 {in particular, page 1287, left column, paragraph starting with "From Eqn. (24)"}).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Liu, in the system of Whitecar because this would enable the Doppler to be estimated and it's effect removed from the received signal, as is well known in the art.

In the same field of endeavor, however, Conner discloses (d) comparing the detected noise level with at least one first reference value (column 5, lines 36 – 45);
(e) comparing the detected channel speed with at least one second reference value (column 5, lines 46 – 51).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Conner, in the system of Whitecar because this would enable generation of pulses when the noise or Doppler exceeds their respective thresholds, thereby providing a means for detecting them, as disclosed by Conner in claim 1 (column 6).

Allowable subject matter

Claims 2, 4 – 7, 9, 11, 13 – 16, 18, 20, 22 – 25, 28, 30 – 33, 35 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Other Prior Art Cited

The prior art made of record and not relied upon is considered pertinent to the applicant's disclosure.

The following patents are cited to further show the state of the art with respect to noise elimination / reduction filters:

Hirata (US 4,099,030) discloses use of a Speech signal processor using comb filter for noise elimination.

Scherbatskoy (US 4,866,680) discloses a matched filter and correlator for noise elimination.

Kato et al. (US 5,353,408) discloses a noise suppressor.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adolf DSouza whose telephone number is 571-272-1043. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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